OPTIMISED MESSAGES CONTAINING BARCODE INFORMATION FOR MOBILE RECEIVING DEVICES

1 **Optimised Mobile Barcode Messages**

2

3 The present invention relates to coupons, in particular

4 delivering coupons containing barcodes to a mobile

5 device.

6

7 The display of a mobile device may be used to generate

8 bar codes for reading by a conventional bar code scanner.

9 This has uses in coupon and ticket applications. The

10 mobile solution has a number of unique aspects when

11 compared to traditional methods such as paper or internet

12 email. These include:

13 - Instant Delivery. The barcode is delivered to the

14 mobile phone almost immediately.

15 - Reach. The consumer can be reached wherever they are.

16 - Increased Redemption. Unlike paper coupons which may be

17 left behind, a mobile phone is normally carried

18 everywhere.

19

20 GB Patent Application Number GB2361570 to British Airways

21 discloses a method of operating a ticketing System. A

22 reservation centre generates data representing a ticket

23 which is broadcast to a mobile station e.g. a cellular

1   phone. The data from the mobile station can then be used
2   to verify the transaction e.g. via a reader linked to a
3   reservations computer. The ticket data can be sent in the
4   form of a text e.g. SMS message or in browser readable
5   format and is preferably in machine readable code.
6   Preferably, the reader is an optical bar or pin code
7   reader. The system is preferably used for air travel. The
8   problems with the disclosed system are that:
9   - There doesn't appear to be a way of enforcing single
10 redemption of a ticket (for security).
11 - It relies on a "SIM toolkit" application in the handset
12 to translate the ticket number into a barcode image. It
13 would be advantageous to deliver the actual barcode image
14 in the message. The SIM toolkit has a number of problems.
15 Many network operators discourage or prevent downloading
16 of applications into the SIM card. SIM storage is limited
17 and it's harder to update the software on all of the
18 phones.
19
20 International Patent Application number WO 01/95267 to
21 Nokia relates to the provision of goods and services.
22 Receipt data corresponding to a purchase of predetermined
23 goods or a service are downloaded to a mobile handset and
24 displayed as a bar code. A vending delivery station
25 receives the receipt data from the handset and enables
26 the provision of the purchase goods or service to the
27 customer. In one example, cinema tickets are provided,
28 printed by a ticket printer. The problem with the system
29 is that it requires the consumer to collect tickets which
30 are printed by a vending station before entry. It would
31 be advantageous to simply treat the phone / barcode as a
32 ticket which is scanned at the actual entry point, thus
33 eliminating the queueing / inconvenience and printing.

1   The publication discloses MPEG film previews when
2   browsing the cinema options. This is not however included
3   as part of the ticket. It would be advantageous to
4   provide multimedia tickets to phones that can support
5   their viewing.
6
7   GB Patent Application Number GB2362012 to IBM discloses
8   Paying for goods and services without needing to carry
9   many cards. A customer, who has registered information
10   such a credit card number with a server, receives payment
11   information as an identification code when he/she pays
12   for a purchase at a store. The payment information can be
13   transmitted wirelessly to the cash register in store, or
14   displayed as a two-dimensional barcode on display of the
15   terminal and read by a barcode reader of the cash
16   register. The payment information is associated with
17   sales information and sent to the server which associates
18   the payment information with the registered information
19   for the customer, seeks approval from the appropriate
20   credit institution, and sends an approval number to the
21   store. A ticket processing system embodiments is also
22   described.
23
24   The problem with both the Nokia and IBM systems is that
25   they don't facilitate operation with a variety of phones
26   with different messaging formats and display or
27   communication capabilities. For example, it would be
28   advantageous for one system to support mobile phones that
29   do or do not support "Picture Messaging" or Bluetooth.
30
31   In this document, including the specification and claims,
32   the term coupon includes vouchers and tickets.
33

1   It is an object of the present invention to deliver

2   coupons to a mobile device.

3

4   According to a first aspect of the present invention,

5   there is provided a system comprising:

6   a message processor means for generating message

7   data comprising a coupon;

8   a mobile device;

9   a message optimiser means for generating an

10   optimised message responsive to said message data

11   and the capabilities of said mobile device; and

12   a communication means for transmitting said

13   optimised message to said mobile device.

14

15 Preferably the system further comprises a database means

16 for storing capabilities of mobile devices.

17

18 Preferably said capabilities comprise at least one device

19 attribute associated with a mobile device type.

20

21 Typically said attribute comprises a display dimension.

22

23 Typically said attribute comprises a colour depth.

24

25 Preferably said communication means comprises a gateway

26 means for transmitting said optimised message to a

27 network.

28

29 Preferably said communication means further comprises a

30 router means for selecting a gateway means for message

31 transmission.

32

33 Preferably said coupon comprises a barcode number.

1

2 Optionally said coupon comprises barcode symbology.

3

4 Optionally said coupon comprises a barcode image.

5

6 Optionally said coupon comprises text content.

7

8 Optionally said optimised message further comprises
9 multimedia content.

10

11 Typically said multimedia content comprises video.

12

13 Optionally said multimedia content comprises audio.

14

15 Optionally said multimedia content comprises a
16 photograph.

17

18 Optionally said system comprises a mobile device type
19 identifier.

20

21 Typically said message data comprises said mobile device
22 type identifier.

23

24 Preferably said message optimiser is responsive to said
25 capabilities corresponding to said mobile device type
26 identifier.

27

28 Preferably said system further comprises a barcode
29 generator means for generating barcodes.

30

31 Optionally said generated barcodes are random barcodes.

32

1 Preferably said system further comprises a barcode
2 encoder means for encoding barcodes.
3
4 According to a second aspect of the present invention,
5 there is provided a method for delivering a message to a
6 mobile device comprising the steps of:
7   generating message data comprising a coupon;
8   generating an optimised message responsive to said
9   message data and the capabilities of said mobile
10   device; and
11   transmitting said optimised message to said mobile
12   device.
13
14 Preferably said method further comprises the step of
15 inputting capabilities of mobile devices.
16
17 Preferably said method further comprises the step of
18 storing capabilities of mobile devices.
19
20 Preferably said capabilities comprise at least one device
21 attribute associated with a mobile device type.
22
23 Typically said attribute comprises a display dimension.
24
25 Typically said attribute comprises a colour depth.
26
27 Preferably said method further comprises the step of
28 transmitting said optimised message to a network.
29
30 Preferably said method further comprises the step of
31 selecting a gateway means for message transmission.
32
33 Preferably said coupon comprises a barcode number.

1

2 Optionally said coupon comprises barcode symbology.

3

4 Optionally said coupon comprises a barcode image.

5

6 Optionally said optimised message further comprises

7 multimedia content.

8

9 Typically said multimedia content comprises video.

10

11 Optionally said multimedia content comprises audio.

12

13 Optionally said multimedia content comprises a

14 photograph.

15

16 Optionally said message data comprises a mobile device

17 type identifier.

18

19 Preferably said method further comprises the step of

20 retrieving capabilities corresponding to a mobile device

21. type identifier.

22

23 Preferably said step of generating an optimised message

24 is responsive to said retrieved capabilities.

25

26 Preferably said step of generating an optimised message

27 comprises downgrading said generated message data.

28

29 Preferably said method further comprises the step of

30 generating barcodes.

31

32 Preferably said generated barcodes are random barcodes.

33

1   Preferably said method further comprises the step of

2   encoding barcodes.

3

4   According to a third aspect of the present invention,

5   there is provided a computer program for carrying out the

6   method above-described.

7

8   According to a fourth aspect of the present invention,

9   there is provided a carrier for carrying the computer

10   program.

11

12   According to a fifth aspect of the present invention,

13   there is provided a message comprising a coupon and

14   multimedia content.

15

16   Typically said multimedia content comprises video.

17

18   Optionally said multimedia content comprises audio.

19

20   Optionally said multimedia content comprises a

21   photograph.

22

23   Preferably said coupon comprises a barcode number.

24

25   Optionally said coupon comprises barcode symbology.

26

27   Optionally said coupon comprises a barcode image.

28

29   In order to provide a better understanding of the present

30   invention, an embodiment will now be described by way of

31   example only and with reference to the accompanying

32   Figures, in which:

33

1　Figure 1 illustrates, in schematic form, the core

2　technology platform in accordance with the present

3　invention;

4

5　Figure 2 illustrates, in schematic form, the core mobile

6　barcode generation, delivery and redemption process in

7　accordance with the present invention;

8

9　Figure 3 illustrates, in schematic form, the redemption

10　architecture and process in accordance with the present

11　invention;

12

13　Figure 4 illustrates, in schematic form, the mobile

14　barcode generation, delivery and redemption process

15　customised for the retail coupon market;

16

17　Figure 5 illustrates, in schematic form, the mobile

18　barcode generation, delivery and redemption process

19　customised for ticketing applications;

20

21　Figure 6 illustrates, in schematic form, the mobile

22　barcode generation, delivery and redemption process

23　customised for security applications;

24

25　The invention is a platform that functions to deliver

26　coupons to a mobile device. Typically the coupons contain

27　barcodes that are redeemed by scanning the display of the

28　mobile device.

29

30　With reference to Figure 1, the application 102

31　interfaces to the core technology platform 104 for

32　advanced mobile messaging using XML content delivered

33　over the internet http protocol.

1

2   The Message Processor 106 is started automatically in

3   response to the delivery of message content to a

4   specified URL.

5

6   The message processor receives the mobile phone number,

7   barcode number and symbology, handset/device type and

8   additional message content for delivery to the device.

9   The handset/device type is optional. When it is provided,

10   it is stored in the database against the mobile number.

11   In the case of future messages for that mobile number

12   where the device type is not provided, then the recorded

13   device type is retrieved. This avoids the need to capture

14   the handset/device type on multiple occasions or for

15   different purposes such as coupon or ticket delivery.

16

17   The message content is provided in XML format, and

18   delivered using the http post protocol. The XML is a list

19   of messages containing information including:

20   - Mobile phone number

21   - Barcode number and symbology

22   - Additional text content (optional)

23   - Recipient details such as Name (optional)

24   - Handset and Network details (optional)

25

26   The Message Processor 106 processes the messages and

27   stores them in the database for retrieval by the Queue

28   Controller 114.

29

30   The Barcode Encoder 108 is invoked to generate barcode

31   images from the barcode number and symbology. The images

32   are stored as Pictures in the database 110.

33

1 Customer systems can be integrated with the mobile
2 messaging platform through the message processor 106.
3
4 The database 110 stores the following core entities:
5 - Barcodes - Barcodes with a particular number and
6   symbology
7 - Pictures - Pictures (may represent a barcode image)
8 - Handset - information on a particular handset including
9   owner details, mobile number, model, etc.
10 - Messages - Outbound and inbound messages
11 - Gateways - Network messaging gateways
12
13 The barcode encoder 108 generates the barcode image for a
14 specified barcode and symbology. The resulting picture is
15 stored in the database 110 in binary form. The encoder
16 supports both linear barcodes such as EAN-8, EAN-13, UPC-
17 A, etc. as well as 2D barcodes such as DataMatrix, PDF-
18 417, etc.
19
20 A similar approach can be used for other advanced message
21 types such as smart tickets.
22
23 The Message Engine 112 starts a separate queue controller
24 114 for each message priority level (1-3). The Message
25 engine 112 also starts the gateways 120.
26
27 The Queue Controllers 114 poll the database 110 at
28 periodic intervals to retrieve all messages with the
29 relevant priority. The messages are then fed through the
30 Message Optimiser 116 and Message Routers 118 and out
31 through the selected gateway 120.
32

1   The Message Optimiser 116 chooses the optimal message

2   format depending on the capabilities of the target

3   handset. For basic handsets, a simple text message will

4   be delivered. Otherwise, subject to the handset

5   supporting the required display dimensions and colour

6   depth, pictures are delivered using the richest format

7   available.

8

9   The Message Optimiser 116 overcomes many of the problems

10   inherent with known methods. In particular, the wide

11   range of device types/models and message protocols

12   restrict many alternative solutions to providing support

13   for only a limited number of users. Devices can vary in

14   their support for particular picture messaging protocols

15   such as Nokia Smart Messaging or EMS (Enhanced Message

16   Service). Device display capabilities such as display

17   resolution also constrain the barcode symbologies and

18   codes that may be represented. The present invention

19   enables a comprehensive support of the installed base of

20   devices to be provided.

21

22   The Message Optimiser 116 takes the barcode image

23   generated by the Barcode Encoder 108, and device type and

24   optimises the messages for transmission based on the

25   capabilities of the target handset.

26

27   Where the target device does not have sufficient

28   capability to receive or represent the message correctly,

29   the content is downgraded accordingly. Ultimately, for a

30   handset that supports only SMS text messaging, then the

31   barcode number and associated text is transmitted. E.g.

32   "Barcode <12345670>. Ticket for Event at Venue on Date".

33   In the case of a text-only barcode, the barcode is

1   redeemed by keying-in the number. This is also the

2   common, automatic approach when a barcode image fails to

3   scan.

4

5   The downgrading of the content is controlled by a

6   hierarchy of rules based on the device capability. This

7   includes:

8   1. MMS support

9   2. EMS support

10 3. Nokia Smart Message support

11 4. Display Resolution

12

13 If the display resolution is insufficient to represent

14 the barcode, then the message is downgraded to text.

15

16 A table of device attributes associated with a device

17 type is maintained in the database 110. This table

18 includes the following information:

19 1. Handset/Device Type

20 2. MMS Support

21 3. EMS Support

22 4. Nokia Smart Message Support

23 5. Display Resolution

24 6. Colour Depth (1 = mono)

25 7. Bluetooth support

26 8. Java support

27

28 Where the handset model is not known, then the

29 capabilities of the database device entry with id of

30 "DEFAULT" are assumed. This enables such behaviour to be

31 controlled. i.e. whether to assume that an unknown

32 handset supports Nokia picture messages or not.

33

1 The barcode image can also be a 2D barcode. A 2D barcode

2 enables a larger amount of information to be contained

3 within the barcode.

4

5 If the device has a multimedia capability, then messages

6 can also be enhanced by the addition of moving video,

7 colour images, and audio clips. Mobile phones may support

8 MMS (Multimedia Messaging Service). In this case a ticket

9 for a music concert could include a short piece of video

10 of the band, an image of the cover of the new album, and

11 an audio clip for a recently released track in addition

12 to the barcode. Similarly, in order to promote a brand, a

13 coupon could contain a video clip and audio from a TV

14 advertisement in addition to the barcode. In security

15 applications, a photograph could be included with the

16 barcode.

17

18 The message router 118 chooses the optimal network

19 gateway based on rules stored in the database. Multiple

20 gateway connections can be supported for load balancing

21 and scalability. Where there is more than one possible

22 route, the gateway with the lowest latency is chosen.

23

24 The gateways 120 are the route to the external SMS

25 gateways or SMS centres over a network. The gateways 120

26 maintain a queue of messages sorted by priority. A number

27 of different SMS gateway technologies are supported

28 including XML/http, SMPP, GSM terminals, etc.

29 Alternatively the gateway 120 can be an email gateway,

30 delivering the messages as an email message. Pictures may

31 be attached as a GIF image.

32

33

1   The SMS gateway 122 is a gateway to the mobile network

2   short messaging service. Alternatively, this may be a

3   direct connection to the mobile network operator's

4   messaging centre. The SMS gateway may support enhanced

5   messages (EMS) such as picture messages. The SMS gateway

6   may be a multi-media message (MMS) gateway for delivery

7   of multimedia messages including high-resolution colour

8   images and video.

9

10 The mobile handset 124 can be a mobile phone or other

11 wireless-enabled device such as a PDA.

12

13 The core technology platform 104 supports processes in a

14 number of applications. Additional components are defined

15 to support the specific steps in such solutions. Thus the

16 system also may include an Automatic Download component

17 126 and a Random Barcode Generator component 128 for

18 customisation of the system as described below for retail

19 coupon and security applications respectively.

20

21 With reference to Figure 2 the core mobile barcode

22 generation, delivery, and redemption process 200 is

23 depicted.

24

25 The consumer opts-in to receive barcodes by registering

26 (step 202) with the supplier. Registration may be through

27 a variety of channels including internet web site,

28 telephone call centre, paper forms, or text message.

29

30 The registration details are stored in the database (step

31 204). The database contains customer contact and

32 profiling information. This information includes:

1 - Customer details and contact information including

2 mobile number and possibly name, email address, postal

3 address, photograph, etc.

4 - Customer demographics including age, sex, etc.

5 - Customer preferences

6 - Customer buying history

7

8 In the Target Profile step (step 206), an offer for a

9 product, service, or information is matched with the

10 database of customer profiles. The matching criteria may

11 include one or more of:

12 - Demographics

13 - Preferences/Product Criteria

14 - Buying History

15

16 The result of the match is a list of mobile numbers for

17 contact purposes and profile information for message

18 personalisation.

19

20 The specified barcodes are generated from the number(s)

21 provided and delivered (step 208) to the list of mobile

22 numbers using the messaging platform. This step is

23 expanded towards the right hand side of Figure 2.

24

25 After inputting and storing (step 210) device attributes

26 defining the device capabilities in the database and

27 inputting (step 212) a device type identifier (e.g. model

28 of mobile 'phone), the system generates (step 214)

29 message data comprising a coupon and optionally the

30 device type identifier.

31

32 The system retrieves (step 216) device attributes

33 defining the device capabilities corresponding to the

1 mobile device type identifier and generates (step 218) an

2 optimised message responsive to the message data and the

3 retrieved capabilities.

4

5 Finally in the delivery step, the system transmits (step

6 220) the optimised message to the target mobile device

7 via one or more gateways through a network.

8

9 The delivery of a barcode is recorded in the database for

10 subsequent authentication purposes.

11

12 The barcode is redeemed (step 222) in the same way as any

13 product containing a barcode, by scanning the mobile

14 phone display using a conventional barcode scanner. An

15 alternative to scanning the barcode for redemption could

16 be to use Bluetooth or an alternative radio or electro-

17 magnetic transmission method.

18

19 The barcode is authenticated (step 224) by examining the

20 barcode delivery records and retrieving the associated

21 customer details. The customer details, possibly

22 including a photograph, may be displayed on a computer

23 display for human validation.

24

25 Barcode redemption is recorded in the database for audit

26 purposes.

27

28 If this barcode is to be redeemed only once, then the

29 barcode record in the database is marked as redeemed, and

30 cannot be redeemed again.

31

32 With reference to Figure 3, the redemption process 300 is

33 shown. In the case of a coupon, the barcode is sent to

1   the mobile device 302 and is scanned at the outlet or
2   venue 304, and the number is used to identify the offer
3   by searching the database in the core technology platform
4   104 according to the present invention. In the case of a
5   single-redemption barcode such as a ticket, the barcode
6   is validated against the database 306. The barcode entry
7   in the database is then marked as 'redeemed' to prevent
8   multiple redemption of the same barcode.
9
10 Specific solutions based on the core technology platform
11 are defined and will be presented below for a number of
12 markets:
13 - Retail Coupons
14 - Ticketing
15 - Security
16
17 With reference to Figure 4, the mobile barcode solution
18 process 400 is customised for the retail coupon market.
19 The mobile barcode represents a discount coupon which is
20 redeemed by scanning in a retail outlet.
21
22 Barcodes representing discount coupons may be redeemed
23 multiple times without any authentication. Indeed, viral
24 marketing may be encouraged through forwarding of the
25 mobile barcode to friends and family.
26
27 In Figures 4, 5 and 6, each of the steps having numbering
28 common with Figure 2 are described above.
29
30 The Coupon Download ("pull") (step 402) is initiated by a
31 consumer via a number of channels including:
32 - Web site
33 - Telephone

1   - Mobile text Message sent to a supplier mobile number

2   .

3   In each case, the recipient's mobile number is captured

4   in order that the mobile barcode coupon may be delivered

5   (step 404).

6

7   The solution builds on the core process with an Automatic

8   Download component 126 shown in Figure 1. The automatic

9   download component 126 is invoked from a web site,

10 automated telephone system, or through receipt of a text

11 message. The component 126 takes the mobile number and

12 barcode number and invokes the Message Processor 106

13 using XML/http to deliver the mobile barcode.

14

15 With reference to Figure 5, the mobile barcode solution

16 process 500 is customised for ticketing applications. The

17 mobile barcode represents a ticket that is redeemed by

18 scanning the phone display at the venue.

19

20 Specific steps in the mobile ticketing solution are:

21 - Deliver Promotional Message (step 502)

22 - Purchase (step 504)

23

24 With reference to Figure 5, the first steps (down to but

25 not including Purchase (step 504)) are optional.

26

27 An example promotional message might be:

28 Ticket available for Sat. Call 0800 123456 or reply "1"

29 to buy.

30

31 The promotional message may be delivered as a simple text

32 message, or might be a richer message including text and

33 pictures.

1

2   The purchase may be achieved through a number of channels

3   including:

4   - Ticket sales call centre

5   - Web site

6   - Text message reply

7

8   Payment may be received through one of many existing

9 . methods including credit card and existing account. When

10   payment is accepted, then the mobile barcode ticket is

11   delivered (step 506).

12

13   As the Message Processor supports simple text messages as

14   well as more sophisticated data (barcodes), the

15   promotional message is delivered using the core platform.

16

17   The ticket purchase is achieved using traditional

18   methods.

19

20   With reference to Figure 6, the mobile barcode solution

21   process 600 is customised for security applications. The

22   mobile barcode represents an identity that is validated

23   by scanning the phone display. Upon validation, access

24   can be granted to a secure location, or a product can be

25   provided.

26

27   There is an automatic random barcode generation step 602.

28   A new random barcode may optionally be generated and

29   delivered every time a barcode is redeemed.

30

31   The solution builds on the core process with the Random

32   barcode generator component 128 shown in Figure 1. The

33   Random barcode generator 128 automatically generates a

1 random barcode number. The barcode number generated is
2 unique amongst unredeemed barcodes in the database.
3
4 Key features of the solutions described herein are:
5 - Targetting using a customer profile database
6 - Dynamic barcode image generation from barcode number
7 and symbology
8 - Delivery of barcode to mobile phone or other wireless
9 device
10 - Redemption and authentication of barcode by scanning
11 display
12 - Specific processes for particular applications
13
14 The solutions described above are implemented using Java
15 2 Enterprise Edition, SQL, and XML (extensible markup
16 language). Alternative technologies could however be used
17 to implement the solutions described above.
18
19 Although the embodiments of the invention described with
20 reference to the drawings comprise computer apparatus and
21 processes performed in computer apparatus, the invention
22 also extends to computer programs, particularly computer
23 programs on or in a carrier, adapted for putting the
24 invention into practice. The program may be in the form
25 of source code, object code, a code of intermediate
26 source and object code such as in partially compiled form
27 suitable for use in the implementation of the processes
28 according to the invention. The carrier may be any
29 entity or device capable of carrying the program.
30
31 For example, the carrier may comprise a storage medium,
32 such as ROM, for example a CD ROM or a semiconductor ROM,
33 or a magnetic recording medium, for example, floppy disc

1   or hard disc.   Further, the carrier may be a

2   transmissible carrier such as an electrical or optical

3   signal which may be conveyed via electrical or optical

4   cable or by radio or other means.

5

6   When the program is embodied in a signal which may be

7   conveyed directly by a cable or other device or means,

8   the carrier may be constituted by such cable or other

9   device or means.

10

11   Alternatively, the carrier may be an integrated circuit

12   in which the program is embedded, the integrated circuit

13   being adapted for performing, or for use in the

14   performance of, the relevant processes.

15

16   Further modifications and improvements may be added

17   without departing from the scope of the invention herein

18   described.

19

20